Your Name Goes Here
Math 387 Analysis I
Homework 6

Problem List
**3.1** {2,3,5}
**3.2** {1,2,3,11}

H/T: Last Names
Spring 2016
Due: Wednesday, March 9

*Unassigned, but suggested: Problems 1,,7,8,10 in Section 3.1*
*Unassigned, but suggested: Problems 4,5,12 in Section 3.2*

## 6.1 Problem 3.1.2

Prove Corollary 3.1.10.

*Solution.* □

## 6.2 Problem 3.1.3

Prove Corollary 3.1.11.

*Solution.* □

## 6.3 Problem 3.1.5

Let $A \subset S$. Show that if $c$ is a cluster point of $A$, then $c$ is a cluster point of $S$. Note the difference from Proposition 3.1.14.

*Solution.* □

## 6.4 Problem 3.2.1

Using the definition of continuity directly prove that $f\colon \mathbb{R} \to \mathbb{R}$ defined by $f(x) := x^2$ is continuous.

*Solution.* □

## 6.5 Problem 3.2.2

Using the definition of continuity directly prove that $f\colon (0,\infty) \to \mathbb{R}$ defined by $f(x) := 1/x$ is continuous.

*Solution.* □

## 6.6 Problem 3.2.3

Let $f\colon \mathbb{R} \to \mathbb{R}$ be defined by

$$f(x) := \begin{cases} x & \text{if } x \text{ is rational,} \\ x^2 & \text{if } x \text{ is irrational.} \end{cases}$$

Using the definition of continuity directly prove that $f$ is continuous at 1 and discontinuous at 2.

*Solution.* □

## 6.7 Problem 3.2.11

Let $f\colon \mathbb{R} \to \mathbb{R}$ be continuous. Suppose $f(c) > 0$. Show that there exists an $\alpha > 0$ such that for all $x \in (c-\alpha, c+\alpha)$ we have $f(x) > 0$.

*Solution.* □